Statement for the Center for Advanced Study
in the Behavioral Sciences

by

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My major long-term preoccupation for the past dozen years has been the preparation of the first full-length biography of Pierre-Simon Laplace, the reigning scientist in France at the turn of the eighteenth century. He is properly known as the man who completed Newton's classical program in celestial mechanics, following out the plans laid down by his English predecessor a century earlier. Laplace demonstrated the stability of the solar system, while at the same time proposing a major new idea about its origins, the nebular hypothesis; he championed the extreme version of determinism, without reference to a supernatural power; he helped engineer the chemical revolution by his new views on the nature of heat and the invention of the calorimeter; he synthesized the dispersed new literature on probability, putting it to use as a major tool in scientific research; he inspired a generation of young researchers who became leaders in their field during the nineteenth century, including Biot, Arago, Poisson, Le Verrier, Quetelet, and Magendie. Yet despite all these accomplishments--or perhaps <u>because</u> of their magnitude--he has never been the object of a major study. The recent writings of Crosland, Gillispie, Guerlac, Fox, Baker, Stigler, and Merleau-Ponty, each of whom touches an aspect of the full story, have only served to deepen my resolve to produce this study.

I had been on the point of writing this work six years ago on the basis of Laplace's printed writings and a few manuscripts that remain, when a systematic search for his correspondence revealed to me a totally unsuspected world. In the 500-odd letters (95% unpublished) that I have located and transcribed, he revealed himself as an insatiably curious, argumentative, speculative natural philosopher, quite different in character from the measured, dry, and fact-oriented scientist he appears in his published works. The bland, politic style he affected as Minister of the Interior and Chancellor of Napoleon's Senate mask a vast concern with contemporary issues and his vision of the scientific elite's place in modern society. My plan for the biography now is to make this recent discovery the key to the work. The tension between the private and public Laplace must be explained, not merely to give the story of his accomplishments some "life," but because I suspect it buttresses several themes common to modern society, particularly the style of positivism and bureaucracy, both of which were pioneered in France. It is not my intent to claim that Laplace was historically responsible for these movements, but to underscore that he displayed attitudes characteristic of modernity which are now commonly assumed by scientists and politicians of all persuasions.

For Laplace, the source of his behavior is to be found, I am convinced, in a blend of disappointment in the uncertainties of theological and metaphysical debates he rehearsed as a youth, with the deep insecurity stemming from his motherless upbringing and a faltering father, who, as a public official and agricultural entrepreneur, was

thwarted from rising in the Norman hierarchy of the ancien régime. These personal experiences correspond to intellectual and social problems of the era, namely the crisis of skepticism, the secularization of French society, and the emergence of meritocracy, themes well elaborated by contemporary commentators. My wish is to speculate beyond this that Laplace's yearning for security was not merely the source of his personal ambitions and special life style, but served as the psychological motor for his search for stability in the solar system, his preference for determinism, his ability to turn the mathematics of chance into a positive tool for natural philosophy, and other choices he made in his philosophical and scientific life. I will maintain that these attitudes also informed his shunning of public speculation, his abandonment of God as an explanatory mechanism, his rejection of theories for the cause of universal gravitation and of the wave theory of light, and his displeasure with Napoleon's romantic adventures at home and on the battlefield. Laplace's coldness in the conduct of state affairs, and his insistence upon expertise as a prerequisite for leadership in politics as well as science were part of a personal style that fitted well with the contemporary experiences of Frenchmen who had managed to emerge unscathed by the turmoil of the Revolution.

To carry out this research project, beyond uninterrupted time and my voluminous research notes, I need to be in touch with psychiatrists (or psychologists with an interest in retroactive personality assessment); with philosophers conversant with the history of skepticism,

positivism, and probability theory; and with sociologists knowledgeable about the behavior of public officials. It would be useful to exchange ideas with scholars like Frank Manuel, Richard Popkin, and Michel Crozier, or their younger counterparts. I would expect to find such a group at the Center. The scholars whose recent works have been a stimulant to my thinking are Charles Gillispie (Princeton), Keith Baker (Chicago), Giorgio Tonelli (SUNY, Binghamton), Ian Hacking (Stanford), and Jean Jacques Salomon (Paris), and it would be ideal to have them all at the Center at the same time.

A related but clearly secondary research concern could also be pursued with profit in the setting of the Center. For the past seven years, I have headed up the Project in History of Science and Technology at Berkeley's Bancroft Library, centered on documenting the rise of physics, medical physics, and electric engineering in the San Francisco Bay Area. Over fifty interviews with major local figures in science, medicine, and industry have been completed, and as many new collections of private papers have been deposited at the Bancroft, the Smithsonian, and the Stanford archives for scholarly use. Taken up with the sheer problems of managing this broad effort at documenting the recent past, I have neglected to study it and to follow up some of its implications. Some of the same themes appear in my Laplace project, but in a somewhat different garb.

First there are the peculiarities of the tool of oral history and autobiography that ought to allow analysts to penetrate to the inner man, but rarely do so. I have been surprised by the poverty of oral

history when compared to what written documents (laboratory notebooks, drafts of papers, correspondence) reveal about the private world of creative personalities. This is not to deny the worth of autobiography or directed interviewing, but to question its usefulness as a stimulus for introspection. Self-justification and rationalization always seem to overshadow the psychological underpinnings being sought.

A second issue concerns determining the true motor of creative activity in modern science and industry when it is set in a bureaucratic context where the need for research funding and the appearance of success is constantly present. Private feelings always must be couched in publicly-acceptable terms, and are transformed into socially-acceptable modes that can betray the original intent. Here the public and private merge in ways that often defy the claims of objectivity. How often can the expert afford to be candid in distinguishing the possible from the probable in his research proposals?

A third dimension to this puzzle must be sought in the metamorphosis of creative activities as they pass from the small, private, independent laboratory to the giant research institutes of our times. What happens in the process? How is individual creativity fostered in a communal environment? To what does it owe its continued success--the charisma of its leaders, the financial gains, the professional status rewards, the spur of belonging to a successful enterprise?

Materials to begin studying these issues are to be found in documentation already assembled, for example from Ernest and John Lawrence, Melvin Calvin, William Hewlett, David Packard and from their

successful giant enterprises, the Berkeley Radiation Laboratory, the Donner Laboratories, the Chemical Biodynamics Laboratory, the Hewlett-Packard Corporation. I would propose to begin thinking some of these problems outloud, to share them with others, and to do some reading and research to narrow down the nub of the issues. Here too, the presence of researchers at the Center, and of the scientific and industrial community in Palo Alto would provide the environment conducive to the advancement of understanding.